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National Occupational Analysis

2007

Human Resources and
Social Development Canada

Ressources humaines et
Développement social Canada

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Occupational Analyses Series

Insulator (Heat and Frost)

2007

Trades and Apprenticeship Division

Workplace Partnerships Directorate

National Occupational Classification:

Disponible en français sous le titre :

Division des métiers et de l'apprentissage

Direction des partenariats
en milieu de travail

7293

Calorifugeur/calorifugeuse (chaleur et froid)

The Canadian Council of Directors of Apprenticeship (CCDA) recognizes this National Occupational Analysis as the national standard for the occupation of Insulator (Heat and Frost).

Background

The first National Conference on Apprenticeship in Trades and Industries, held in Ottawa in 1952, recommended that the federal government be requested to cooperate with provincial and territorial apprenticeship committees and officials in preparing analyses of a number of skilled occupations. To this end, Human Resources and Social Development Canada (HRSDC) sponsors a program, under the guidance of the Canadian Council of Directors of Apprenticeship (CCDA), to develop a series of national occupational analyses.

The National Occupational Analyses have the following objectives:

- to describe and group the tasks performed by skilled workers;
- to identify which tasks are performed in every province and territory;
- to develop instruments for use in the preparation of Interprovincial Red Seal Examinations and curricula for training leading to the certification of skilled workers;
- to facilitate the mobility of apprentices and skilled workers in Canada; and,
- to supply employers, employees, associations, industries, training institutions and governments with analyses of occupations.

ACKNOWLEDGEMENTS

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| | |
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**LIST OF PUBLISHED
NATIONAL OCCUPATIONAL ANALYSES
(Red Seal Trades)**

| TITLE | NOC* Code |
|---|----------------------|
| Appliance Service Technician (2005) | 7332 |
| Automotive Painter (2005) | 7322 |
| Automotive Service Technician (2005) | 7321 |
| Baker (2006) | 6252 |
| Boilermaker (2003) | 7262 |
| Bricklayer (2007) | 7281 |
| Cabinetmaker (2000) | 7272 |
| Carpenter (2005) | 7271 |
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| Construction Electrician (2003) | 7241 |
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| Electronics Technician – Consumer Products (1997) | 2242 |
| Farm Equipment Mechanic (2000) | 7312 |
| Floorcovering Installer (2005) | 7295 |
| Glazier (2004) | 7292 |
| Hairstylist (2005) | 6271 |
| Heavy Duty Equipment Technician (2004) | 7312 |
| Industrial Electrician (2003) | 7242 |
| Industrial Instrument Mechanic (2000) | 2243 |
| Industrial Mechanic (Millwright) (2007) | 7311 |
| Insulator (Heat and Frost) (2007) | 7293 |
| Ironworker (Generalist) (2006) | 7264 |
| Ironworker (Reinforcing) (2006) | 7264 |
| Ironworker (Structural/Ornamental) (2006) | 7264 |
| Lather (Interior Systems Mechanic) (2002) | 7284 |
| Machinist (2005) | 7231 |

* National Occupational Classification

| TITLE | NOC* Code |
|--|----------------------|
| Metal Fabricator (Fitter) (2003) | 7263 |
| Mobile Crane Operator (2006) | 7371 |
| Motorcycle Mechanic (2006) | 7334 |
| Motor Vehicle Body Repairer (Metal and Paint) (2005) | 7322 |
| Oil Burner Mechanic (2006) | 7331 |
| Painter and Decorator (2000) | 7294 |
| Partsperson (2005) | 1472 |
| Plumber (2003) | 7251 |
| Powerline Technician (2004) | 7244 |
| Recreation Vehicle Service Technician (2006) | 7383 |
| Refrigeration and Air Conditioning Mechanic (2004) | 7313 |
| Roofer (2006) | 7291 |
| Sheet Metal Worker (2006) | 7261 |
| Sprinkler System Installer (2003) | 7252 |
| Steamfitter – Pipefitter (2007) | 7252 |
| Tilesetter (2004) | 7283 |
| Tool and Die Maker (2005) | 7232 |
| Transport Trailer Technician (2003) | 7321 |
| Truck and Transport Mechanic (2007) | 7321 |
| Welder (2004) | 7265 |

Requests for these National Occupational Analyses may be forwarded to:

Trades and Apprenticeship Division
Workplace Partnership Directorate
Human Resources and Social Development Canada
140 Promenade du Portage, Phase IV, 5th Floor
Gatineau, Quebec K1A 0J9

These publications are also available to order or download online at: www.red-seal.ca. Links to Essential Skills Profiles for some of these trades are also available on this website.

STRUCTURE OF ANALYSIS

To facilitate understanding of the occupation, the work performed is divided into the following categories:

| | |
|---|--|
| Block | the largest division within the analysis which reflects a distinct set of operations relevant to the occupation. |
| Task | the distinct activity that, combined with others, makes up the logical and necessary steps the worker is required to perform in a block. |
| Sub-Task | the smallest division of work activities that, combined together, fully describe all duties of a task. |
| Supporting Knowledge and Abilities | the elements of skill and knowledge that an individual must acquire to adequately perform a sub-task. |

Information on the following areas of this occupation is also provided throughout the analysis:

| | |
|----------------------------|--|
| Trends | any shifts or changes in technology that affect the block. |
| Context | statements written to clarify the intent and meaning of tasks. |
| Related Components | components related to a specified task being undertaken. |
| Tools and Equipment | types of tools and equipment necessary to perform the work on all given tasks identified within the block. More detailed lists of these types are shown in Appendix A. |

The appendices located at the end of the analysis are described as follows:

| | |
|--|--|
| Appendix A – Tools and Equipment | a non-exhaustive list of tools and equipment used in this trade. |
| Appendix B – Glossary | definitions or explanations for terms used in this analysis. |
| Appendix C – Acronyms | a list of acronyms used in this analysis with their full name. |
| Appendix D – Block and Task Weighting | the block and task percentages as submitted by each jurisdiction at the validation stage and the national averages of these percentages. |
| Appendix E – Pie Chart | a graph which depicts the national percentages assigned to blocks. |
| Appendix F – Task Profile Chart | a chart which outlines graphically the blocks, tasks and sub-tasks of this analysis. |

Development of Analysis

A draft analysis is developed by a committee of industry experts in the field led by a team of facilitators from HRSDC. This draft analysis breaks down all the tasks performed in the occupation and describes the knowledge and abilities required for a tradesperson to demonstrate competence in the trade.

The NOA development team then forwards a copy of the analysis and its translation to provincial/territorial authorities for a review of its content and structure. Their recommendations are assessed and incorporated into the analysis.

Validation and Weighting Method

This copy of the analysis is sent to all provinces/territories for validation and weighting. Each jurisdiction validates the document with the use of a provincial/territorial trade advisory committee. They examine the blocks, tasks and sub-tasks of the analysis:

- | | |
|------------------|---|
| BLOCKS | Each committee assigns percentages to blocks based on the number of questions that they would assign for each block on a hundred question examination of the entire trade. |
| TASKS | Each committee assigns percentages to tasks based on the number of questions that would be assigned to each task on a hundred question examination for its block. |
| SUB-TASKS | Sub-tasks are examined by each committee and they indicate with a YES or NO whether or not each sub-task is performed by the skilled workers within the occupation in their jurisdiction. |

The results of this exercise are submitted to the NOA development team who then analyzes the data and incorporates it into the document. The analysis provides the individual jurisdictional validation results as well as the national averages of all responses. The national averages for block and task weighting provide guidelines for the development of the Interprovincial Red Seal Examination for the trade.

This method for the validation of the National Occupational Analysis also identifies common core sub-tasks across Canada for the occupation. If at least 70% of the responding jurisdictions perform a sub-task, it shall be considered common core. Interprovincial Red Seal Examinations are based on the common core sub-tasks identified through this validation process.

Definitions for Validation and Weighting

| | |
|--|--|
| YES | sub-task is performed by qualified workers in the occupation in a specific jurisdiction. |
| NO | sub-task is not performed by qualified workers in the occupation in a specific jurisdiction. |
| NV | <u>N</u> ot <u>V</u> alidated by a province/territory. |
| ND | <u>N</u> ot <u>D</u> esignated in a province/territory. |
| NOT COMMON CORE (NCC) | sub-task, task or block is performed by less than 70% of responding jurisdictions; these are not to appear on the Interprovincial Red Seal Examination for this trade. |
| BLOCK % | the average percentage of questions that will be placed on an Interprovincial Red Seal Examination to assess each block of the analysis. |
| TASK % | the average percentage of questions that will be placed on an Interprovincial Red Seal Examination to assess each task of the analysis. |

Provincial/Territorial Abbreviations

| | |
|-----------|---------------------------|
| NL | Newfoundland and Labrador |
| NS | Nova Scotia |
| PE | Prince Edward Island |
| NB | New Brunswick |
| QC | Quebec |
| ON | Ontario |
| MB | Manitoba |
| SK | Saskatchewan |
| AB | Alberta |
| BC | British Columbia |
| NT | Northwest Territories |
| YT | Yukon Territory |
| NU | Nunavut |

ANALYSIS

Safe working procedures and conditions, accident prevention, and the preservation of health are of primary importance to industry in Canada. These responsibilities are shared and require the joint efforts of government, employers and employees. It is imperative that all parties become aware of circumstances that may lead to injury or harm. Safe learning experiences and work environments can be created by controlling the variables and behaviours that may contribute to accidents or injury.

It is generally recognized that safety-conscious attitudes and work practices contribute to a healthy, safe and accident-free work environment.

It is imperative to apply and be familiar with the Occupational Health and Safety Acts and Workplace Hazardous Materials Information System (WHMIS) Regulations. As well, it is essential to determine workplace hazards and take measures to protect oneself, co-workers, the public and the environment.

As safety education is an integral part of training in all jurisdictions, personal safety practices are not recorded in this document. However, the technical safety aspects relating to each task and sub-task are included throughout this analysis.

SCOPE OF THE INSULATOR (HEAT AND FROST) TRADE

"Insulator (Heat and Frost)" is this trade's official Red Seal occupational title approved by the CCDA. This analysis covers tasks performed by an insulator (heat and frost) whose occupational title has been identified by some provinces and territories of Canada under the following names:

| | NL | NS. | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|----------------------------|----|-----|----|----|----|----|----|----|----|----|----|----|----|
| Heat and Frost Insulator | | | | | | | | | | ✓ | | | |
| Insulator | | | | | ✓ | | | ✓ | ✓ | | | | |
| Insulator (Heat and Frost) | ✓ | ✓ | ✓ | ✓ | | | ✓ | | | | ✓ | ✓ | |

Insulators work with different kinds of insulation material to prevent or reduce the passage of heat, cold, vapour, moisture, sound or fire. They read and interpret drawings and specifications to determine insulation requirements, select the amount and type of insulation to be installed and measure and cut insulating material to the required dimensions. They then apply, install, repair and maintain insulation material. Insulated surfaces may be finished with materials such as plastics, aluminum, galvanized steel and coated steel, stainless steel, canvas, mastic, laminate or concrete. Some insulators may also lay out and fabricate parts on-site or remove or seal off old insulation.

Types of insulation materials that may be used include calcium silicate, ceramic fibre, elastomeric insulation, mineral fibre, fibreglass, urethane, polystyrene and cellular glass. They may be used for systems such as plumbing, air-handling, heating, cooling and refrigeration, for piping equipment and pressure vessels, as well as for walls, floors and ceilings of buildings, industrial complexes and ships.

Removing old insulation material such as asbestos, ceramic fibres, lead and mould is also part of the trade. Special training and licenses may be required to deal with these types of materials. Spraying insulation materials is another specialized part of the trade.

Insulators are employed by construction companies, insulation contractors and industrial plants, or may also be self-employed. They work on residential, industrial, commercial and institutional projects. Their work schedules depend on the type of work they are doing, ranging from 40-hour weeks with possible overtime in order to meet deadlines, to shift work in plants or irregular work hours. Schedules may depend on the availability of contracts or inconvenience or health risks to adjacent workers or the public.

Insulators work with a number of hand tools and power tools. Insulators use equipment such as respirators, coveralls and safety glasses to protect themselves from the hazards of materials. Also, insulators frequently require scaffolds, aerial lifts and ladders to help them accomplish their tasks. They can work indoors or outdoors, often in extreme temperatures. Depending on the location of work, they may be required to travel.

The ability to be focused and responsible is a vital part of insulators' work and safety. The work often requires spending most of the day on their feet, bending, kneeling, working at heights, climbing (scaffolds, ladders) and lifting. Insulators must be able to use their body to brace large items and guide objects or materials into place. This requires them to have a good combination of motor co-ordination and manual and finger dexterity.

This analysis recognizes similarities or overlaps with the work of roofers, sheet metal workers, painters and carpenters.

With experience, insulators act as mentors and trainers to apprentices in the trade. They could also move into positions such as maintenance, instructor, contractor, foreperson, superintendent or estimator.

OCCUPATIONAL OBSERVATIONS

Due to rising energy costs and environmental concerns, the work of insulators has become more important in the construction industry.

There are new insulation materials being introduced such as aluminum impregnated insulation, wicking type insulation and endothermic sheets for fireproofing electrical trays. Their application and maintenance requires that insulators stay up-to-date. More prefabricated materials have emerged, but insulators are still required to do layout and fabrication on-site. Using pre-fabricated parts has freed up insulators' time and allowed them to concentrate on the installation part of their trade.

Many tools have become more technologically advanced. For instance, computers are now commonly used by insulators for tasks such as accessing specifications and blueprints (Computer Assisted Drawing —CAD), receiving work orders and for the delivery of safety training. Also, there are more electric and power fabrication tools.

Planning and scheduling has improved so that when insulators arrive on the jobsite, the work is ready to begin.

Safety has become paramount throughout the industry. The goal of every worksite is zero accidents.

BLOCK A

OCCUPATIONAL SKILLS

| | |
|----------------------------|---|
| Context | Occupational skills describe the skills used throughout the trade. |
| Trends | Safety is increasingly recognized as an important factor in the industry. There is more computer skill required by insulators in their work. |
| Related Components | All components apply. |
| Tools and Equipment | See Appendix A. |

Task 1 Maintains tools and equipment.

Sub-task

1.01 Maintains hand tools.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|---|
| 1.01.01 | knowledge of types of standard hand tools such as snips, saws, tape measure, knives and nippers |
| 1.01.02 | knowledge of types of specialty tools such as band tensioners and band crimpers |
| 1.01.03 | knowledge of hand tool limitations |
| 1.01.04 | ability to organize hand tools |
| 1.01.05 | ability to store hand tools |
| 1.01.06 | ability to clean and lubricate hand tools |
| 1.01.07 | ability to recognize worn, damaged or defective hand tools |

Sub-task**1.02****Maintains power tools.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | no | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|---|
| 1.02.01 | knowledge of types of standard power tools such as electric shears, drills and electric saws |
| 1.02.02 | knowledge of types of specialty power tools such as High Efficiency Particulate Absolute (HEPA) vacuums, sewing machines, stud guns and pin welders |
| 1.02.03 | knowledge of power tool limitations |
| 1.02.04 | knowledge of laws and regulations pertaining to certification of power tools such as HEPA vacuum and negative air machines |
| 1.02.05 | knowledge of required operator certification for tools such as powder actuated tools and pin guns |
| 1.02.06 | ability to organize power tools |
| 1.02.07 | ability to store power tools to protect them from the elements |
| 1.02.08 | ability to recognize worn, damaged or defective power tools |

Sub-task**1.03****Maintains spray equipment.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|---|
| 1.03.01 | knowledge of types of spray equipment such as airless, spray pumps and pressure fed |
| 1.03.02 | knowledge of assembly and disassembly of spray equipment |
| 1.03.03 | knowledge of cleaning solvents and cleansers |
| 1.03.04 | knowledge of maintenance procedures such as applying lubricants to moveable parts |
| 1.03.05 | ability to clean spray equipment |

- 1.03.06 ability to store spray equipment
- 1.03.07 ability to recognize and replace worn, damaged or defective spray equipment parts such nozzles, hoses and spray tips

Sub-task

1.04 Maintains layout and fabrication tools and equipment.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

- 1.04.01 knowledge of types of layout tools such as dividers, square, straight edge, tape measure, circumference ruler and scratch awl
- 1.04.02 knowledge of types of fabrication tools and equipment such as lock former, brake, combination machine (beader/crimper) and tin snips
- 1.04.03 knowledge of the limitations of fabrication equipment
- 1.04.04 ability to store layout and fabrication equipment to protect them from the elements
- 1.04.05 ability to recognize worn, damaged or defective layout and fabrication equipment
- 1.04.06 ability to clean and lubricate layout and fabrication equipment
- 1.04.07 ability to make adjustments to layout and fabrication equipment

Sub-task

1.05 Maintains personal protective equipment (PPE) and safety equipment.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

- 1.05.01 knowledge of PPE such as safety glasses, gloves, boots, respirators, hearing protection and hard hats
- 1.05.02 knowledge of safety equipment such as fall arrest equipment, warning tape, first aid kit and eye wash station
- 1.05.03 knowledge of PPE and safety equipment operation

| | |
|---------|--|
| 1.05.04 | knowledge of location of safety equipment |
| 1.05.05 | ability to clean and store PPE and safety equipment |
| 1.05.06 | ability to recognize unsafe, worn, damaged or defective PPE and safety equipment |

Task 2 Organizes work.

Sub-task

2.01 Performs task scheduling.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|---|
| 2.01.01 | knowledge of daily and job deadlines |
| 2.01.02 | knowledge of work to be done by other trades |
| 2.01.03 | knowledge of sequence of task activities |
| 2.01.04 | knowledge of work release procedures |
| 2.01.05 | ability to organize and prioritize daily tasks |
| 2.01.06 | ability to calculate material required for the task |
| 2.01.07 | ability to keep track of hours worked |

Sub-task

2.02 Interprets specifications and drawings.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|---|
| 2.02.01 | knowledge of types of drawings such as mechanical, architectural, structural and electrical |
| 2.02.02 | knowledge of location of specification and drawings |
| 2.02.03 | ability to interpret symbols found on blueprints |

| | |
|---------|---|
| 2.02.04 | ability to read isometrics |
| 2.02.05 | ability to use a scale ruler |
| 2.02.06 | ability to read drawing components such as schedule, scales, details and legend |

Sub-task

2.03 Uses documentation.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|--|
| 2.03.01 | knowledge of company policies and procedures such as company safety programs |
| 2.03.02 | knowledge of Occupational Health and Safety (OH&S) regulations |
| 2.03.03 | knowledge of WHMIS symbols and Material Safety Data Sheets (MSDS) |
| 2.03.04 | ability to fill out documentation such as start cards, pre-job assessments and field-level hazard analysis |
| 2.03.05 | ability to identify and label hazardous materials according to WHMIS |
| 2.03.06 | ability to interpret documents such as manufacturers' specifications, job specifications, information tags, work permits and packing slips |

Sub-task

2.04 Communicates with others.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|---|
| 2.04.01 | knowledge of trade terminology |
| 2.04.02 | knowledge of verbal and written communication |
| 2.04.03 | ability to communicate with supervisors |
| 2.04.04 | ability to coordinate work with other trades regarding work plans |
| 2.04.05 | ability to participate in safety and information meetings |

Sub-task**2.05****Organizes materials.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|--|
| 2.05.01 | knowledge of storage procedures such as labels out, off the ground and protected from elements |
| 2.05.02 | knowledge of the types and sizes of materials required for each job |
| 2.05.03 | ability to estimate amount of material needed for each job |
| 2.05.04 | ability to store material in secure manner |
| 2.05.05 | ability to sort material in sequence needed to accomplish job |

Task 3**Performs routine trade activities.**

Sub-task**3.01****Performs measurements.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|---|
| 3.01.01 | knowledge of mathematical formulas such as basic geometry and converting decimals to fractions |
| 3.01.02 | knowledge of imperial and metric systems and conversion from one to another |
| 3.01.03 | ability to use measuring tools such as tape measure, calipers and thickness gauge |
| 3.01.04 | ability to use calculators |
| 3.01.05 | ability to calculate layout dimensions of components such as insulation, cladding, removable covers and jacketing |
| 3.01.06 | ability to perform on-site measurements |

Sub-task**3.02**

Uses access equipment.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|--|
| 3.02.01 | knowledge of types of access equipment such as ladders, aerial lifts, swing stages and scaffolds |
| 3.02.02 | knowledge of certification requirements for access equipment |
| 3.02.03 | knowledge of fall protection requirements when working on access equipment |
| 3.02.04 | knowledge of angles of ladders |
| 3.02.05 | knowledge of three-point contact rule |
| 3.02.06 | knowledge of scaffolding tags |
| 3.02.07 | knowledge of worksite surroundings |
| 3.02.08 | knowledge of barriers such as pylons, barricades, warning tape and signage |
| 3.02.09 | ability to set up step ladders, extension ladders and pre-engineered scaffolding |
| 3.02.10 | ability to work from access equipment |
| 3.02.11 | ability to recognize unsafe, worn, damaged or defective access equipment |

Sub-task**3.03**

Prepares substrate.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|--|
| 3.03.01 | knowledge of the types of substrates on components such as tanks, ducts and pipes |
| 3.03.02 | knowledge of the materials of substrates such as steel, copper and galvanized metal |
| 3.03.03 | knowledge of the thickness of the material to be applied |
| 3.03.04 | knowledge of the types of materials to be applied such as fireproofing, soundproofing and cement |

| | |
|---------|---|
| 3.03.05 | knowledge of compatibility of insulation material and substrate |
| 3.03.06 | knowledge of PPE requirements such as face shields, respirators and hearing protection |
| 3.03.07 | knowledge of the variations in the preparation according to the substrate |
| 3.03.08 | knowledge of types of protrusions and irregularities in the substrate |
| 3.03.09 | knowledge of hazards associated with preparing substrate such as grinding epoxy paints and lead paint |
| 3.03.10 | knowledge of release procedures |
| 3.03.11 | knowledge of types of fasteners such as pins and clips, wire and banding |
| 3.03.12 | ability to grind and pin |
| 3.03.13 | ability to set fasteners |
| 3.03.14 | ability to clean substrate by scraping, grinding and drying |

Sub-task

3.04

Applies sealants.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|---|
| 3.04.01 | knowledge of types of sealants such as mastics, lagging, caulking and foil tape |
| 3.04.02 | knowledge of the application of sealants such as on cladding, foam glass and polyvinyl chloride (PVC) |
| 3.04.03 | knowledge of watershed |
| 3.04.04 | knowledge of required PPE |
| 3.04.05 | ability to remove sealants from surfaces |
| 3.04.06 | ability to determine which sealant is suited to the job |
| 3.04.07 | ability to use sealant according to manufacturers' specifications |

Sub-task

3.05

Maintains safe work environment.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

- 3.05.01 knowledge of employer policies and procedures such as safety training
- 3.05.02 knowledge of client's rules and procedures such as evacuation routes, warning signals and location of safety equipment
- 3.05.03 knowledge of first aid requirements such as worker training and location of on-site first aid stations and equipment
- 3.05.04 knowledge of types and application of PPE such as respirators, fall arrest equipment and eye protection
- 3.05.05 knowledge of workers' rights and responsibilities
- 3.05.06 knowledge of federal, provincial/territorial and municipal health and safety acts and regulations such as OH&S
- 3.05.07 knowledge of training requirements such as fall protection, confined space entry and hoisting
- 3.05.08 knowledge of housekeeping practices
- 3.05.09 knowledge of fire safety and work permit procedures
- 3.05.10 knowledge of types and operation of fire extinguisher equipment
- 3.05.11 knowledge of emergency phone numbers
- 3.05.12 ability to comply with all regulations, policies and procedures in the workplace
- 3.05.13 ability to recognize and report potential hazards
- 3.05.14 ability to use PPE and safety equipment
- 3.05.15 ability to recognize limitations of use of PPE and safety equipment

BLOCK B

INDUSTRIAL APPLICATION

Trends

There is an increase in the use of computers for specifications and blueprints (CAD – Computer Assisted Drawing). Electrically-operated fabrication tools are being used more on the work site. Materials are increasingly being supplied in metric measurements.

There is an increased emphasis on safety in the industrial worksite, including safety orientations and increased documentation.

Related Components

Boilers, piping, breaching, fittings, turbines, exhaust systems, hangers, precipitators, vessels, tanks, chillers; reactors, furnaces, ducts, heat exchangers, columns, instruments.

Materials: seals, banding, wire, cladding, insulation, screws, pop rivets, pins, studs, rails.

Tools and Equipment

Hand tools, power tools, layout and fabrication tools, spray equipment, PPE and safety equipment.

Task 4

Installs insulation for piping and fittings.

Context

Insulators insulate piping and fittings to prevent thermal and sound transmission and to provide personnel protection. Proper fit of insulation around pipes, fittings and hangers is essential to the safe, efficient and cost effective operation of the industrial process.

Sub-task

4.01

Selects pipe insulation.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|--|
| 4.01.01 | knowledge of types of pipe insulation such as fibreglass, urethane and mineral fibre |
| 4.01.02 | knowledge of types of piping systems such as process, steam and cooling |

| | |
|---------|---|
| 4.01.03 | knowledge of pipe material such as copper, iron and stainless steel |
| 4.01.04 | knowledge of pipe sizes |
| 4.01.05 | knowledge of location and temperature range of piping |
| 4.01.06 | knowledge of specifications |
| 4.01.07 | knowledge of heat tracing such as steam and electric |
| 4.01.08 | knowledge of multiple layer application |
| 4.01.09 | ability to recognize types of insulation |
| 4.01.10 | ability to calculate amount of insulation required |

Sub-task

4.02

Fabricates insulation for pipe fittings and hangers.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|---|
| 4.02.01 | knowledge of types of pipe fittings such as valves, tees, transitions and elbows |
| 4.02.02 | knowledge of types of elbows such as 90°, 45°, long radius, short radius and sweeps |
| 4.02.03 | knowledge of types of valves such as check, gate and globe |
| 4.02.04 | knowledge of types of hangers such as shoes, sleeves and clevises |
| 4.02.05 | ability to interpret mitre chart |
| 4.02.06 | ability to calculate number of mitres and pipe dimensions such as heel and throat |
| 4.02.07 | ability to lay out and cut materials for mitres, hangers and pipe transitions |
| 4.02.08 | ability to use tools such as band saw, hand saw, knife and tape measure |
| 4.02.09 | ability to apply adhesives to assemble fittings |

Sub-task

4.03

Cuts pipe insulation.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|---|
| 4.03.01 | knowledge of types of pipe insulation such as fibreglass, calcium silicate, cellular glass and urethane |
| 4.03.02 | knowledge of hazards associated with various types of insulation |
| 4.03.03 | knowledge of various angles |
| 4.03.04 | ability to use tools such as band saw, hand saw, knife, dividers and tape measure |
| 4.03.05 | ability to calculate pipe insulation lengths |
| 4.03.06 | ability to field mark insulation for cutting |

Sub-task

4.04

Fits pipe insulation.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|---|
| 4.04.01 | knowledge of securement methods such as wire, banding and tape |
| 4.04.02 | knowledge of pipe specifications |
| 4.04.03 | knowledge of pipe expansion and contraction |
| 4.04.04 | knowledge of results of poor fitting pipe insulation |
| 4.04.05 | knowledge of oversize piping methods for traced pipe |
| 4.04.06 | ability to customize insulation for tight fit |
| 4.04.07 | ability to fill voids and cracks in insulation |
| 4.04.08 | ability to use securement tools such as nippers, pliers and band tensioners |
| 4.04.09 | ability to use multilayering methods |

Task 5

Installs insulation for tanks, vessels and equipment.

Context

Insulators insulate tanks, vessels, instrumentation, accessories and equipment to regulate temperature and to suppress noise. Tanks include crude oil, liquefied natural gas and asphalt tanks. Vessels are pressurized and include desalters, aerators and crackers. Equipment includes boilers, pumps, reactors and columns/towers.

Sub-task**5.01****Cuts insulation for tanks, vessels and equipment.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|--|
| 5.01.01 | knowledge of types of insulation such as fibreglass, cellular glass and mineral fibre |
| 5.01.02 | knowledge of types of tanks such as crude oil tanks, liquefied natural gas tanks and asphalt tanks |
| 5.01.03 | knowledge of types of vessels such as desalters, aerators and crackers |
| 5.01.04 | knowledge of equipment such as boilers, pumps and turbines |
| 5.01.05 | knowledge of hazards associated with various types of insulation |
| 5.01.06 | knowledge of manufacturers' specifications of insulation and equipment |
| 5.01.07 | knowledge of various angles |
| 5.01.08 | knowledge of basic geometry such as area and circumference |
| 5.01.09 | ability to use tools such as table saw, hand saw, knife, dividers and tape measures |
| 5.01.10 | ability to cut insulation lags to fit around tanks and vessels |
| 5.01.11 | ability to calculate and cut pies for tank and vessel heads and bottoms |
| 5.01.12 | ability to score board insulation to fit tank and vessel circumference and support rings |

Sub-task**5.02****Fits insulation for tanks, vessels and equipment.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|--|
| 5.02.01 | knowledge of tank, vessel and equipment expansion and contraction |
| 5.02.02 | knowledge of the importance of tight fitting insulation |
| 5.02.03 | knowledge of insulation specifications such as cellular glass on bottom 18 inches of tanks |
| 5.02.04 | knowledge of lifting equipment such as pulley systems and tuggers |

| | |
|---------|--|
| 5.02.05 | ability to trim and customize insulation for tight fit |
| 5.02.06 | ability to fill voids and cracks in insulation |
| 5.02.07 | ability to stagger joints in insulation for multiple layer application |

Sub-task

5.03

Fastens insulation on tanks, vessels and equipment.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|--|
| 5.03.01 | knowledge of securement methods such as pins, studs and rails, banding and hexagonal wire mesh |
| 5.03.02 | knowledge of tank and vessel specifications such as location of pins and studs, types and spacing of banding |
| 5.03.03 | knowledge of lifting equipment such as pulley systems and tuggers |
| 5.03.04 | ability to layout and install insulation pins and studs using tools such as grinders and pin welders |
| 5.03.05 | ability to calculate and construct bands for tanks and vessels |
| 5.03.06 | ability to use fastening methods such as cementing, using hexagonal mesh and using wire |

Task 6

Installs protective cladding.

Context

Insulators install protective cladding to protect insulation from weather and mechanical abuse. It is also used to enhance the appearance. Fabrication and installation of cladding is a very technical part of an insulator's work. Cladding is a trade term that may also be called jacketing when installing protective covers over piping, tanks and vessels.

Sub-task**6.01****Selects cladding.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|---|
| 6.01.01 | knowledge of types of cladding material such as steel, stainless steel, aluminum and silicone cloth |
| 6.01.02 | knowledge of compatibility of cladding materials |
| 6.01.03 | knowledge of location of piping and equipment |
| 6.01.04 | knowledge of effect of environmental conditions on cladding materials |
| 6.01.05 | knowledge of expansion and contraction of cladding materials |
| 6.01.06 | knowledge of gauge of cladding materials required for application |
| 6.01.07 | knowledge of fastening systems for cladding |
| 6.01.08 | ability to select material for flashing and support rings |
| 6.01.09 | ability to recognize types of cladding |
| 6.01.10 | ability to calculate amount of cladding required |

Sub-task**6.02****Performs cladding layout.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|--|
| 6.02.01 | knowledge of layout methods such as radial line, parallel line and triangulation |
| 6.02.02 | knowledge of fastening systems |
| 6.02.03 | knowledge of starting point for layout |
| 6.02.04 | ability to use layout tools such as dividers, scratch awl, levels, trammel points, tape measure and squares |
| 6.02.05 | ability to perform calculations required to construct geometric shapes such as cones, pyramids and transitions |
| 6.02.06 | ability to transfer measurements to cladding material |

Sub-task**6.03****Fabricates cladding.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|--|
| 6.03.01 | knowledge of types of cladding material such as steel, stainless steel and aluminum |
| 6.03.02 | knowledge of location of application |
| 6.03.03 | knowledge of watershed requirements |
| 6.03.04 | ability to cut cladding using tools such as circular saws, power shears, slitler and foot operated shears (guillotine) |
| 6.03.05 | ability to use shop fabrication tools such as combination machine (beader/crimper), lock former, brake and rollers |
| 6.03.06 | ability to use field fabrication tools such as dividers, snips, tape measure and straight edge |
| 6.03.07 | ability to create safety edges on cladding |

Sub-task**6.04****Assembles cladding components.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|--|
| 6.04.01 | knowledge of types of components such as sheets, expansion rings, pies, gores, and vessel and tank heads |
| 6.04.02 | knowledge of types of cladding such as corrugated, flat stock and embossed |
| 6.04.03 | knowledge of specifications such as spacing of screws and bands, and horizontal and vertical laps |
| 6.04.04 | knowledge of fastening components such as S and U clips, bands, seals and springs |
| 6.04.05 | ability to use techniques for cladding to ensure watershed |
| 6.04.06 | ability to modify fabricated cladding in the field |
| 6.04.07 | ability to match corrugations on sheet cladding |

| | |
|---------|--|
| 6.04.08 | ability to ensure tank cladding is installed level |
| 6.04.09 | ability to determine starting position for tank cladding and tank heads |
| 6.04.10 | ability to maintain horizontal and vertical laps on piping and tank cladding |

Task 7

Installs removable covers.

Context

Removable covers are used to minimize heat loss and protect personnel. They also provide access to fittings and equipment for maintenance or inspection. Insulators are responsible for the layout and fabrication of the covers, usually in a shop environment. They also must fit and fasten the covers in the field.

Sub-task

7.01

Lays out removable covers.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|---|
| 7.01.01 | knowledge of types of removable covers such as pads, blankets and metal boxes |
| 7.01.02 | knowledge of materials used such as fibreglass, ceramic fibre, steel knit mesh and silicone cloth |
| 7.01.03 | knowledge of basic mathematics and geometry |
| 7.01.04 | ability to use layout tools such as dividers, scratch awls, levels, tape measures, trammel points and squares |
| 7.01.05 | ability to draw field sketches based on type of installation |
| 7.01.06 | ability to perform calculations such as circumference of removable pads; overlaps and location of cut-outs |
| 7.01.07 | ability to calculate fabrication machinery allowances such as laps, lock formed seam and easy-edge |

Sub-task**7.02**

Fabricates removable covers.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|---|
| 7.02.01 | knowledge of types of removable pad insulation such as fibreglass blanket and ceramic fibre blanket |
| 7.02.02 | knowledge of types of metal box insulation such as rigid fibreglass, mineral fibre, polystyrene and urethane |
| 7.02.03 | knowledge of sequence of assembling components |
| 7.02.04 | ability to fabricate soft cover using tools such as hog ringer, stitch stapler and sewing machines |
| 7.02.05 | ability to fabricate hard covers using tools such as brake, lock former and easy-edger |
| 7.02.06 | ability to install and seal insulation in metal boxes |
| 7.02.07 | ability to install fastening devices for soft covers such as lacing anchors, D-rings, hook and loop, and draw strings |
| 7.02.08 | ability to install fastening devices for hard covers such as rivets, suitcase latches and screws |

Sub-task**7.03**

Fits removable covers.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|---|
| 7.03.01 | knowledge of uses of removable covers |
| 7.03.02 | knowledge of types of removable covers such as pads, blankets and metal boxes |
| 7.03.03 | ability to modify covers in the field to fit equipment and fittings |
| 7.03.04 | ability to use fastening devices such as lacing anchors, hook and loop, draw strings and suitcase latches |

Task 8**Insulates for refractory and cryogenic applications.****Context**

Insulators apply insulation materials in refractory (above +815°C/1500°F) and cryogenic (below -101°C/-150°F) applications. Selection of insulation materials is done by engineers or the client. The insulation must be properly installed in order to prevent heat or cold loss. Improper fitting insulation in cryogenic applications could result in ice build-up and system failure.

Sub-task**8.01**

Applies insulation to refractory systems.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | no | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|---|
| 8.01.01 | knowledge of types of refractory insulation systems such as reflective, castable and cavity |
| 8.01.02 | knowledge of temperature range of refractory application |
| 8.01.03 | knowledge of specifications |
| 8.01.04 | knowledge of location to be insulated |
| 8.01.05 | knowledge of application methods such as trowelling and pouring |
| 8.01.06 | knowledge of expansion and contraction |
| 8.01.07 | knowledge of procedures for elimination of thermal shock |
| 8.01.08 | ability to use cushioning blankets in multi-layer applications |
| 8.01.09 | ability to prepare insulation products |
| 8.01.10 | ability to build and install reflective systems |
| 8.01.11 | ability to build expansion joints |
| 8.01.12 | ability to secure insulation materials |

Sub-task**8.02**

Applies insulation to cryogenic systems.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|--|
| 8.02.01 | knowledge of types of cryogenic insulation systems such as reflective, rigid insulation and multi-layered construction |
| 8.02.02 | knowledge of types of vapour barriers such as metal, sealants and low temperature self-adhesive membrane |
| 8.02.03 | knowledge of temperature range of cryogenic applications |
| 8.02.04 | knowledge of importance of tight fits in cryogenic applications |
| 8.02.05 | knowledge of expansion rate of foam |
| 8.02.06 | knowledge of location to be insulated |
| 8.02.07 | knowledge of application methods such as trowelling, pouring and spraying |
| 8.02.08 | knowledge of expansion and contraction of joints |
| 8.02.09 | knowledge of specifications such as securement, thermal bridging of hangers and other protrusions |
| 8.02.10 | ability to apply mastic to butter seams on cellular glass |
| 8.02.11 | ability to build contraction joints |
| 8.02.12 | ability to secure insulation materials |
| 8.02.13 | ability to apply and maintain vapour barriers |

Task 9

Installs underground insulating systems.

Context

Underground systems are used for convenience and aesthetics, and to transfer products for heating and process piping. Insulators use various methods to insulate the piping.

Sub-task

9.01

Applies pipe insulation to underground systems.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|---|
| 9.01.01 | knowledge of types of pipe insulation such as cellular glass, urethane and fibreglass |
|---------|---|

| | |
|---------|---|
| 9.01.02 | knowledge of types of insulation jacketing for underground systems such as asphalt-based membrane, and fibreglass cloth and resin |
| 9.01.03 | knowledge of expansion and contraction of pipe |
| 9.01.04 | ability to cut and fit pipe insulation |
| 9.01.05 | ability to apply mastics |
| 9.01.06 | ability to use torch to heat seal protective membrane |
| 9.01.07 | ability to apply jacketing to keep out moisture and dirt |
| 9.01.08 | ability to secure jacketing and insulation using materials such as banding, tape and wire |

Sub-task

9.02 Applies pour-in-place insulation to underground systems.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|---------|---|
| 9.02.01 | knowledge of types of pour-in-place granular insulation |
| 9.02.02 | knowledge of expansion and contraction of pipe |
| 9.02.03 | knowledge of hazards of materials and location |
| 9.02.04 | ability to apply polyethylene film to forms in trench |
| 9.02.05 | ability to pour insulation materials from bags |
| 9.02.06 | ability to operate vibration equipment |
| 9.02.07 | ability to distribute insulation around pipes |

Task 10

Insulates for soundproofing for industrial applications.

Context

Insulation is often applied to industrial piping and equipment solely for the purpose of sound suppression. Insulators regularly work on the piping and equipment while it is operating.

Sub-task**10.01****Insulates industrial piping for soundproofing.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 10.01.01 | knowledge of types of piping requiring soundproofing such as natural gas, high pressure steam and process piping |
| 10.01.02 | knowledge of basics of sound transmission |
| 10.01.03 | knowledge of types of soundproofing insulation materials such as fibreglass, mineral fibre, lead and barium |
| 10.01.04 | knowledge of types of jacketing such as aluminum and stainless steel |
| 10.01.05 | knowledge of hazards of working with natural gas piping such as extreme noise and working with lead |
| 10.01.06 | ability to install jacketing over insulation |
| 10.01.07 | ability to secure insulation with components such as banding and wire |

Sub-task**10.02****Insulates turbines and equipment for soundproofing.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 10.02.01 | knowledge of industrial components requiring soundproofing such as turbines, pumps and induction fans |
| 10.02.02 | knowledge of soundproofing insulation such as ceramic fibre and mineral fibre |
| 10.02.03 | knowledge of types of jacketing such as aluminum and stainless steel |
| 10.02.04 | knowledge of basics of sound transmission |
| 10.02.05 | knowledge of hazards of working with equipment such as moving parts, heightened sound and extreme heat |
| 10.02.06 | knowledge of layout of fasteners |
| 10.02.07 | ability to cut and fit insulation around equipment |

- 10.02.08 ability to secure insulation using methods such as pin welding, banding, and hexagonal wire mesh
- 10.02.09 ability to apply finishes such as cement and fibreglass cloth

Task 11

Insulates for marine applications. (NOT COMMON CORE)

Context

Bulkheads, deckheads and hulls in marine applications may be insulated for thermal insulation, fire prevention and noise suppression. Insulators also work on piping, ducting, fire stopping and exhaust pipes on marine applications. These activities are identical to other industrial activities already detailed in this document.

Sub-task

11.01

Insulates bulkheads, deckheads and hulls.

(NOT COMMON CORE)

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | no | no | no | yes | NV | NV | NV |

Supporting Knowledge & Abilities

- 11.01.01 knowledge of insulation materials such as mineral fibre, fibreglass and fabric-faced insulation
- 11.01.02 knowledge of pin and clip fastening systems
- 11.01.03 knowledge of multi-layer application of insulation
- 11.01.04 knowledge of sequence of application of insulation
- 11.01.05 knowledge of marine approved materials
- 11.01.06 knowledge of hazards associated with marine applications such as confined space, epoxies and paints
- 11.01.07 ability to operate pin welder
- 11.01.08 ability to customize insulation boards to irregular surfaces
- 11.01.09 ability to fasten insulation using clips on pins

Sub-task**11.02****Installs finish material on marine applications.****(NOT COMMON CORE)**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV, | yes | NV | yes | yes | ND | no | no | no | yes | NV | NV | NV |

Supporting Knowledge & Abilities

- | | |
|----------|---|
| 11.02.01 | knowledge of types of finish material such as perforated metal, reinforced foil flame retardant kraft (RFFRK), fabric finish system, aluminum and steel |
| 11.02.02 | knowledge of stud and rail system for installing finish material over insulation |
| 11.02.03 | knowledge of sequence of application of finish materials |
| 11.02.04 | ability to install finish caps |
| 11.02.05 | ability to apply tape to fabric and RFFRK finish system |

BLOCK C

COMMERCIAL APPLICATION

Trends

Due to the rising cost in energy, insulation in commercial applications is becoming more prevalent. Due to concerns surrounding mould, there have been changes in the way canvas is applied. Furthermore, some jurisdictions have banned the use of wheat paste or wheat paste mixtures, insisting on straight lagging use. Safety is becoming a higher priority within the industry. Some new, easier to use materials are appearing on the market.

Related Components

Piping, tanks, pumps, fittings, hangers, boilers, heat exchangers, chillers, refrigeration systems, breachings, mufflers, vessels, duct work, plenums, fan housings, removable covers.

Insulation materials: fibreglass, mineral fibre, elastomeric insulation, polystyrene, urethane, canvas, corner bead, aluminum, PVC, stainless steel, lead sheeting, barium.

Fastening materials: staples, glue, banding, seals, pins, clips, contact adhesives, cements, screws, lagging, tape, twine, wire, hexagonal wire mesh, mastic.

Tools and Equipment

Hand tools, pin welder, drill, heat gun, grinders, layout and fabrication equipment, spray equipment, PPE and safety equipment.

Task 12

Insulates plumbing systems and mechanical piping.

Context

Commercial insulators insulate plumbing systems such as domestic hot and cold water and rainwater leaders. Mechanical piping includes steam, condensate, heating lines and chilled water. They are insulated for thermal, freeze protection and condensation. Most commercial systems are not exposed to the extreme temperature changes and harsh environment prevalent in industrial systems.

Sub-task

12.01

Selects insulation for plumbing systems and mechanical piping.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 12.01.01 | knowledge of plumbing systems such as cold and hot water and recirculation systems |
| 12.01.02 | knowledge of mechanical systems such as heating, cooling and refrigeration |
| 12.01.03 | knowledge of the types of insulation such as fibreglass, mineral fibre, elastomeric insulation and insulation cement |
| 12.01.04 | knowledge of specifications |
| 12.01.05 | knowledge of adhesives and fasteners |
| 12.01.06 | ability to distinguish between supply and return piping |
| 12.01.07 | ability to calculate the amount of insulation needed to accomplish job |
| 12.01.08 | ability to match material to existing work or surfaces on renovation and maintenance work |

Sub-task

12.02

Cuts insulation for plumbing systems and mechanical piping.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|---|
| 12.02.01 | knowledge of plumbing systems such as hot, cold, recirculation water, and rainwater leaders |
| 12.02.02 | knowledge of mechanical piping systems such as heating, chilled water and refrigeration |
| 12.02.03 | knowledge of piping components such as valves, tees, elbows and reducers |
| 12.02.04 | knowledge of the types of insulation such as fibreglass, elastomeric insulation and mineral fibre |
| 12.02.05 | knowledge of layout angles ° |
| 12.02.06 | ability to use hand tools such as tape measure, knife and saw |
| 12.02.07 | ability to perform precise cuts according to measurements |
| 12.02.08 | ability to cut insulation to fit plumbing and mechanical piping and fittings |

Sub-task**12.03****Fits insulation for plumbing systems and mechanical piping.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|---|
| 12.03.01 | knowledge of plumbing systems such as hot, cold, recirculation water, and rainwater leaders |
| 12.03.02 | knowledge of mechanical piping systems such as heating, chilled water and refrigeration |
| 12.03.03 | knowledge of piping components such as valves, tees, elbows and reducers |
| 12.03.04 | knowledge of the types of insulation such as fibreglass, elastomeric insulation and mineral fibre |
| 12.03.05 | knowledge of layout angles |
| 12.03.06 | ability to use hand tools such as tape measure, knife and saw |
| 12.03.07 | ability to alter insulation sections to accommodate hangers, valves and elbows |
| 12.03.08 | ability to fasten insulation to piping system using fasteners such as self-seal laps, tape, wire, banding and staples |

Sub-task**12.04****Installs vapour barrier on plumbing systems and mechanical piping.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|---|
| 12.04.01 | knowledge of vapour barrier requirements |
| 12.04.02 | knowledge of types of vapour barrier products such as All Service Jacket (ASJ), RFFRK and mastics |
| 12.04.03 | knowledge of importance of vapour barrier |
| 12.04.04 | ability to apply adhesives |
| 12.04.05 | ability to apply mastics |
| 12.04.06 | ability to ensure integrity of the seal |

Task 13**Insulates mechanical ducting.****Context**

Commercial insulators insulate mechanical ducting used in ventilation systems. They are insulated for thermal application and to prevent condensation. Application of a vapour barrier is critical in air conditioning systems.

Sub-task**13.01**

Selects insulation for mechanical ducting.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 13.01.01 | knowledge of mechanical ventilation systems |
| 13.01.02 | knowledge of the types of insulation such as fibreglass, rigid board and flexible blanket/batts |
| 13.01.03 | knowledge of specifications |
| 13.01.04 | knowledge of adhesives and fasteners |
| 13.01.05 | ability to distinguish between supply, return, fresh air, plenum, exhaust and combustion air ducts |
| 13.01.06 | ability to calculate the amount of insulation needed to accomplish job |
| 13.01.07 | ability to match material to existing work or surfaces on renovation and maintenance work |

Sub-task**13.02**

Cuts insulation for mechanical ducting.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|---|
| 13.02.01 | knowledge of mechanical ventilation systems |
| 13.02.02 | knowledge of the types of insulation such as fibreglass, rigid board and flexible blanket/batts |
| 13.02.03 | knowledge of layout angles |

| | |
|----------|---|
| 13.02.04 | ability to use hand tools such as tape measure and knife |
| 13.02.05 | ability to perform precise cuts according to measurements |
| 13.02.06 | ability to score insulation |

Sub-task

13.03 Fits insulation for mechanical ducting.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 13.03.01 | knowledge of mechanical ventilation systems |
| 13.03.02 | knowledge of the types of insulation such as fibreglass, rigid board and flexible blanket/batts |
| 13.03.03 | ability to use hand tools such as tape measure, knife and nippers |
| 13.03.04 | ability to use power tools such as pin welders |
| 13.03.05 | ability to alter insulation sections to accommodate hangers, elbows and transitions |
| 13.03.06 | ability to fasten insulation to mechanical ducting using fasteners such as staples, foil tape, adhesives, pins and clips |

Sub-task

13.04 Installs vapour barrier for mechanical ducting.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 13.04.01 | knowledge of vapour barrier requirements |
| 13.04.02 | knowledge of types of vapour barrier products such as RFFRK, tar paper and mastics |
| 13.04.03 | knowledge of importance of vapour barriers |
| 13.04.04 | ability to apply adhesives |
| 13.04.05 | ability to apply mastics |
| 13.04.06 | ability to ensure integrity of the vapour barrier |

Task 14**Insulates mechanical equipment.****Context**

Mechanical equipment includes hot water tanks, boilers, pumps, chillers and condensate tanks. They are insulated for thermal and prevention of condensation. Protective coverings are also used in the insulation of mechanical equipment.

Sub-task**14.01**

Selects insulation for mechanical equipment.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|---|
| 14.01.01 | knowledge of mechanical systems and equipment such as pumps, fans, boilers and chillers |
| 14.01.02 | knowledge of types of insulation such as fibreglass, rigid board, elastomeric insulation and flexible blanket/batts |
| 14.01.03 | knowledge of specifications |
| 14.01.04 | knowledge of adhesives and fasteners |
| 14.01.05 | ability to calculate the amount of insulation needed to accomplish job |
| 14.01.06 | ability to match material to existing work or surfaces on renovation and maintenance work |

Sub-task**14.02**

Cuts insulation for mechanical equipment.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|---|
| 14.02.01 | knowledge of mechanical equipment such as pumps, fans, boilers and chillers |
| 14.02.02 | knowledge of types of insulation such as fibreglass, rigid board, elastomeric insulation and flexible blanket/batts |
| 14.02.03 | knowledge of layout angles |

| | |
|----------|--|
| 14.02.04 | ability to use hand tools such as tape measure and knife |
| 14.02.05 | ability to perform precise cuts to shape insulation to the equipment |

Sub-task

14.03 Fits insulation for mechanical equipment.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 14.03.01 | knowledge of mechanical equipment such as pumps, fans, tanks, boilers and chillers |
| 14.03.02 | knowledge of types of insulation such as fibreglass, rigid board, elastomeric insulation and flexible blanket/batts |
| 14.03.03 | knowledge of layout angles |
| 14.03.04 | ability to use hand tools such as tape measure and knife |
| 14.03.05 | ability to use power tools such as pin welders and drills |
| 14.03.06 | ability to alter insulation sections to accommodate irregular surfaces, protrusions and hangers |
| 14.03.07 | ability to fasten insulation to mechanical equipment using fasteners such as staples, foil tape, adhesives, pins and clips |
| 14.03.08 | ability to fit removable covers |

Sub-task

14.04 Installs vapour barrier for mechanical equipment.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 14.04.01 | knowledge of vapour barrier requirements |
| 14.04.02 | knowledge of types of vapour barrier products such as RFFRK, tar paper and mastics |
| 14.04.03 | knowledge of importance of vapour barriers |
| 14.04.04 | ability to apply adhesives |

| | |
|----------|---|
| 14.04.05 | ability to apply mastics |
| 14.04.06 | ability to ensure integrity of the vapour barrier |

Task 15

Installs protective finishes.

Context

The finish in commercial applications is for prevention of water damage, mechanical abuse and fibre erosion. It is also used to enhance the appearance.

Sub-task

15.01

Selects protective finishes.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|---|
| 15.01.01 | knowledge of types of protective finishes such as PVC, stainless steel, aluminum, canvas and cement |
| 15.01.02 | knowledge of specifications |
| 15.01.03 | knowledge of adhesives and fasteners |
| 15.01.04 | ability to calculate the amount of finishing material needed to accomplish job |
| 15.01.05 | ability to match material to existing work or surfaces on renovation and maintenance work |

Sub-task

15.02

Cuts protective finishes.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 15.02.01 | knowledge of types of protective finishes such as PVC, stainless steel, aluminum, canvas, lagging and cements as well as their properties and applications |
| 15.02.02 | ability to use hand tools such as tape measure, scissors, snips and knife |
| 15.02.03 | ability to lay out fittings such as tees, valves and elbows |
| 15.02.04 | ability to fabricate fittings |
| 15.02.05 | ability to cut out patterns |

Sub-task

15.03

Fits protective finishes.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 15.03.01 | knowledge of types of protective finishes such as PVC, stainless steel, aluminum, canvas, lagging and cements as well as their properties and applications |
| 15.03.02 | knowledge of preformed products such as PVC fittings and metal elbows |
| 15.03.03 | knowledge of techniques such as watershed and lap placement |
| 15.03.04 | knowledge of fitting layout |
| 15.03.05 | ability to apply and shape cement to match contour of the pipe |
| 15.03.06 | ability to trim and shape protective finishes to the mechanical systems |
| 15.03.07 | ability to choose adhesives and fasteners according to the finish |
| 15.03.08 | ability to fasten finish to mechanical systems using fasteners such as lagging, screws, banding, PVC glue, tacks and tape |

Task 16

Insulates for soundproofing for commercial applications.

Context

Insulation is often applied to commercial piping and equipment solely for the purpose of sound suppression. Insulators regularly work on the piping and equipment while it is operating. Some commercial applications for soundproofing are for recording studios, movie theatres, hotels and mechanical rooms.

Sub-task**16.01**

Selects soundproofing materials.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 16.01.01 | knowledge of soundproofing materials such as lead, barium, fibreglass (acoustic liner) and mineral fibre |
| 16.01.02 | knowledge of specifications |
| 16.01.03 | knowledge of adhesives and fasteners |
| 16.01.04 | ability to calculate the amount of soundproofing material needed to accomplish job |
| 16.01.05 | ability to match material to existing work or surfaces on renovation and maintenance work |

Sub-task**16.02**

Insulates piping for soundproofing.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|---|
| 16.02.01 | knowledge of basic sound transmission |
| 16.02.02 | knowledge of types and properties of acoustic materials such as mineral fibre and blanket |
| 16.02.03 | knowledge of specifications |
| 16.02.04 | ability to install and fasten material to ensure acoustic integrity |
| 16.02.05 | ability to apply appropriate finish |
| 16.02.06 | ability to use hearing protection |

Sub-task**16.03**

Insulates plenums for soundproofing.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 16.03.01 | knowledge of basic sound transmission |
| 16.03.02 | knowledge of types of acoustic materials such as rigid board and flexible acoustic liner |
| 16.03.03 | knowledge of specifications |
| 16.03.04 | ability to install, fasten and seal material to ensure acoustic integrity |
| 16.03.05 | ability to use hearing protection |
| 16.03.06 | ability to use tools such as pin welder, drill, tape measure and knife |
| 16.03.07 | ability to perform maintenance and repair on existing soundproofing of plenums |

Sub-task

16.04 Installs acoustic panels to ceilings and walls.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 16.04.01 | knowledge of the properties of acoustic materials |
| 16.04.02 | knowledge of types of acoustic material such as rigid fibreglass board and spacer bars |
| 16.04.03 | knowledge of specifications |
| 16.04.04 | knowledge of air spaces |
| 16.04.05 | knowledge of support systems for hanging acoustic systems |
| 16.04.06 | ability to use tools such as drill, tape measure and knife |
| 16.04.07 | ability to fasten acoustic panels with fasteners such as cup pins and hangers |
| 16.04.08 | ability to hang acoustic panels from ceilings |
| 16.04.09 | ability to fabricate ceiling and wall acoustic panels |

BLOCK D

ASBESTOS ABATEMENT

Trends

Removal has become more prevalent than enclosure or encapsulation. There has been an increase in the enforcement of regulations governing the removal of asbestos. There is greater awareness of hazards of working around material containing asbestos.

Related Components

Piping, furnaces, boilers, tanks, vessels, turbines, breaching, walls, ceilings, ships.

Tools and Equipment

Hand tools, negative air units, HEPA vacuums, spray equipment, PPE and safety equipment.

Task 17

Prepares for asbestos abatement.

Context

Because of the severe health risks associated with asbestos-related products, any potential for airborne contamination must be mitigated. Extreme precautions must be taken in preparation for removal or containment of asbestos.

Sub-task

17.01

Retrieves sample of asbestos for testing.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 17.01.01 | knowledge of rules and regulations governing asbestos abatement |
| 17.01.02 | knowledge of asbestos products such as crocidolite, amosite and chrysotile |
| 17.01.03 | knowledge of testing facilities |
| 17.01.04 | knowledge of containment devices for asbestos samples |
| 17.01.05 | ability to use sampling tools such as glove bags and hand tools |
| 17.01.06 | ability to document sampling information |
| 17.01.07 | ability to apply temporary seal |
| 17.01.08 | ability to isolate area from public access |

Sub-task**17.02**

Determines scope of work.

| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|---|
| 17.02.01 | knowledge of size of the job |
| 17.02.02 | knowledge of personnel requirements |
| 17.02.03 | ability to determine amount of asbestos to be removed, enclosed or encapsulated |
| 17.02.04 | ability to assess level of risk |
| 17.02.05 | ability to determine materials and tools required |

Sub-task**17.03**

Determines required PPE for asbestos abatement.

| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 17.03.01 | knowledge of rules and regulations governing the use of PPE for asbestos abatement |
| 17.03.02 | knowledge of types of PPE such as HEPA filters, gloves and disposable coveralls |
| 17.03.03 | knowledge of disposal and decontamination requirements for PPE used with asbestos |
| 17.03.04 | ability to determine level of risk |
| 17.03.05 | ability to fit, test and adjust PPE |

Sub-task**17.04**

Prepares site for removal or containment of asbestos.

| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 17.04.01 | knowledge of rules and regulations for asbestos removal or containment sites |
| 17.04.02 | knowledge of size of the site |
| 17.04.03 | knowledge of required materials such as disposal containers, ties, wires and duct tape |
| 17.04.04 | knowledge of access to utilities such as water and electricity |
| 17.04.05 | ability to plan disposal access routes (bag rooms) |
| 17.04.06 | ability to set up drain for high risk removals |
| 17.04.07 | ability to isolate area from public access with danger tape and signage |

Sub-task

17.05

Builds temporary enclosure.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|---|
| 17.05.01 | knowledge of rules and regulations for temporary enclosures such as required overlap, double doors and ventilation requirements |
| 17.05.02 | knowledge of types of temporary enclosures such as glove bags and asbestos hoarding (bubble) |
| 17.05.03 | knowledge of required negative air units and their locations |
| 17.05.04 | knowledge of materials used for temporary enclosure such as studs and polyethylene |
| 17.05.05 | knowledge of location of temporary enclosure |
| 17.05.06 | ability to determine requirements for decontamination such as number of showers, access to water and size of bag room |
| 17.05.07 | ability to build and maintain decontamination facilities |
| 17.05.08 | ability to set up required lighting |
| 17.05.09 | ability to use contact adhesive and tape to seal laps |

Sub-task**17.06****Determines disposal methods and requirements.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | no | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|---|
| 17.06.01 | knowledge of rules and regulations governing disposal of asbestos and other products, such as disposable coverall, filters and gloves |
| 17.06.02 | knowledge of disposal procedures such as double bagging and labelling |
| 17.06.03 | ability to communicate disposal procedures to others |

Task 18**Performs asbestos removal procedures.****Context**

Asbestos may be removed entirely with extreme precautions and according to jurisdictional rules and regulations.

Sub-task**18.01****Removes asbestos.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 18.01.01 | knowledge of procedures for asbestos removal such as wetting down and double bagging |
| 18.01.02 | knowledge of hot and cold removal procedures |
| 18.01.03 | knowledge of decontamination procedures |
| 18.01.04 | knowledge of monitoring requirements and procedures |
| 18.01.05 | knowledge of precautions required for removal |
| 18.01.06 | ability to use glove bags |
| 18.01.07 | ability to use tools for asbestos removal |
| 18.01.08 | ability to clean and encapsulate site after removal |
| 18.01.09 | ability to maintain asbestos removal equipment such as changing filters |

Sub-task**18.02****Disposes of asbestos materials.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|---|
| 18.02.01 | knowledge of path to disposal container bin |
| 18.02.02 | knowledge of disposal containers and disposal sites |
| 18.02.03 | knowledge of disposal container labelling systems |
| 18.02.04 | ability to remove temporary enclosures |
| 18.02.05 | ability to dispose of temporary enclosures |
| 18.02.06 | ability to re-establish site to original condition |

Task 19**Performs maintenance repair.****Context**

If removal is cost-prohibitive or unrealistic, the asbestos must be contained so that the fibres do not become exposed to air (friable). Enclosing the asbestos means to box it in such as with metal or drywall. Encapsulating the asbestos is applying penetrating sealants, sprays or lagging canvas to asbestos to prevent airborne contaminants.

Sub-task**19.01****Encapsulates asbestos.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 19.01.01 | knowledge of types of encapsulants such as mastics, liquid glues and cements |
| 19.01.02 | knowledge of methods of application such as sprayed, painted and trowelled |
| 19.01.03 | ability to select product for task at hand |
| 19.01.04 | ability to use tools and equipment such as spray gun, trowel and brush |

Sub-task**19.02****Encloses asbestos.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 19.02.01 | knowledge of risk factors |
| 19.02.02 | knowledge of types of enclosures such as steel studs, drywall and metal cladding |
| 19.02.03 | knowledge of when asbestos can be enclosed |
| 19.02.04 | ability to plan permanent enclosure structure around asbestos |
| 19.02.05 | ability to ensure enclosure is structurally sound and airtight |
| 19.02.06 | ability to determine method of repair such as boxing, covering and taping |

BLOCK E

SPRAYING INSULATING MATERIALS

Trends

Spraying has become a very specialized skill in this trade.

Related Components

Turbines, tanks, refrigerators, structural steel, decking, piping, bulkheads, vessels, duct, breechings, buildings.

Materials: Mineral fibre, ceramic fibres, calcium, urethane, cement, fibreglass, cellulose fibre, hexagonal wire mesh, metal lathe, fasteners.

Tools and Equipment

Spray equipment, hand tools, power tools, PPE and safety equipment.

Task 20

Prepares for spraying.

Context

Spray insulation can be used for a variety of purposes including thermal insulation, fire protection and soundproofing. Preparation of materials and the surrounding work area must be done before spraying begins.

Sub-task

20.01

Protects surrounding work area for spraying.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|---|
| 20.01.01 | knowledge of locations of finished products such as electrical panels, machinery and existing finished surfaces |
| 20.01.02 | knowledge of types of material used to protect surfaces such as drop cloths, fire blankets and polyethylene |
| 20.01.03 | knowledge of spray pressure to be used |
| 20.01.04 | ability to cover air vents, piping, electrical panels and trays, and finished products |
| 20.01.05 | ability to overlap and tape protective sheeting |

Sub-task**20.02****Prepares material, equipment and substrate for spraying.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 20.02.01 | knowledge of equipment to be used for spraying |
| 20.02.02 | knowledge of materials to be sprayed such as cellulose fibre, urethane, sealants, coatings and mastics |
| 20.02.03 | knowledge of cleaning materials such as tri-sodium phosphate (TSP), methyl ethyl ketone (MEK) and methyl hydrate |
| 20.02.04 | knowledge of procedures and ratios for mixing material |
| 20.02.05 | knowledge of temperature condition of substrate |
| 20.02.06 | knowledge of curing times and ambient conditions |
| 20.02.07 | knowledge of expansion rates for urethane |
| 20.02.08 | ability to assemble equipment |
| 20.02.09 | ability to inspect substrate for readiness |
| 20.02.10 | ability to mix material |
| 20.02.11 | ability to clean and prime substrate |

Task 21**Sprays insulation, sealers and coatings.****Context**

Spray insulation can be used for a variety of purposes including thermal insulation, fire protection and soundproofing. This method of insulating requires distinct skills.

Sub-task**21.01****Installs reinforcing material for spraying.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 21.01.01 | knowledge of types of reinforcing material such as hexagonal wire mesh, glass fabric and metal lathe |
| 21.01.02 | knowledge of substrate limitations |
| 21.01.03 | ability to locate anchor points to secure reinforcing material |
| 21.01.04 | ability to determine requirements for reinforcing materials |
| 21.01.05 | ability to fasten reinforcing material using techniques such as pinning, wrapping and bonding |

Sub-task

21.02

Applies spray.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 21.02.01 | knowledge of materials to be sprayed such as urethane, cellulose fibre, sealants, coatings and mastics |
| 21.02.02 | knowledge of hazards and required PPE |
| 21.02.03 | knowledge of specifications such as thickness of material, number of layers, density and required finish |
| 21.02.04 | ability to operate spray equipment such as airless, two-part guns and hoppers |
| 21.02.05 | ability to spray evenly and to desired thickness |
| 21.02.06 | ability to apply multiple layers |
| 21.02.07 | ability to apply patch coats |
| 21.02.08 | ability to knock down/tamp to required density |

Trends

There are new fire stopping systems being introduced to the industry.

Related Components

Structural steel, decking, exhaust vents, piping, ducts, bulkheads, electrical trays.

Materials: cellulose fibre, mineral fibre, caulking, firebrick, grout, hexagonal wire mesh, metal lathe, intumescent material, endothermic material, ceramic cloth, composite sheets.

Tools and Equipment

Spray equipment, hand tools, power tools, PPE and safety equipment.

Task 22

Installs fire stop systems.

Context

Fire stopping is designed to compartmentalize fire to one area so that it is easily contained. It is applied to building and structural penetrations and also acts as a smoke seal to prevent noxious fumes and smoke from spreading to adjacent areas.

Sub-task**22.01**

Applies fire stop materials.

| | | | | | | | | | | | | | |
|-----------|-----------|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | : | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|--|
| 22.01.01 | knowledge of engineering specifications |
| 22.01.02 | knowledge of purpose of fire stops |
| 22.01.03 | knowledge of fire stop products such as self-levelling caulking, firebrick, ceramic cloth, endothermic materials, and intumescent putty, caulking and strips |
| 22.01.04 | knowledge of responsibility of stakeholders such as building owners, engineers, architects and general contractor |
| 22.01.05 | ability to calculate materials to be used |

| | |
|----------|---|
| 22.01.06 | ability to install damming materials |
| 22.01.07 | ability to use application techniques such as wrapping, stuffing, and pouring |
| 22.01.08 | ability to use power tools such as jig saws and powder actuated tools |

Sub-task

22.02 **Covers fire stop materials.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|---|
| 22.02.01 | knowledge of engineering specifications |
| 22.02.02 | knowledge of purpose of fire stop covering |
| 22.02.03 | knowledge of types of fire stop finishes such as concrete, two-part water based mastics and metal |
| 22.02.04 | ability to fasten fire stop coverings in place |

Task 23

Installs fireproofing.

Context

Fireproofing is applied to structural components such as beams, shafts and decking to prolong the steel's integrity.

Sub-task

23.01 **Applies fireproofing to structural components.**

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | no | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|---|
| 23.01.01 | knowledge of structural components to be fireproofed such as legs on vessels, beams, skirts and hangers |
| 23.01.02 | knowledge of types of fireproofing systems such as sprayed and poured-in-place |

| | |
|----------|--|
| 23.01.03 | knowledge of materials such as cellulose fibre and Pyrocrete™ |
| 23.01.04 | knowledge of multilayer application |
| 23.01.05 | knowledge of job specifications |
| 23.01.06 | ability to prepare surface for application such as cleaning, and applying hexagonal wire mesh or metal lathe |
| 23.01.07 | ability to install damming materials |
| 23.01.08 | ability to calculate materials to be used |
| 23.01.09 | ability to use application techniques such as spraying, trowelling and pouring |

Sub-task

23.02

Applies fireproofing to electrical components.

| | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <u>NL</u> | <u>NS</u> | <u>PE</u> | <u>NB</u> | <u>QC</u> | <u>ON</u> | <u>MB</u> | <u>SK</u> | <u>AB</u> | <u>BC</u> | <u>NT</u> | <u>YT</u> | <u>NU</u> |
| NV | yes | NV | yes | yes | ND | yes | yes | yes | yes | NV | NV | NV |

Supporting Knowledge & Abilities

| | |
|----------|---|
| 23.02.01 | knowledge of electrical components to be fireproofed such as cable trays and conduits |
| 23.02.02 | knowledge of materials such as mineral fibre, cellulose fibre and aluminum silica |
| 23.02.03 | ability to calculate materials to be used |
| 23.02.04 | ability to use application techniques such as wrapping and banding |
| 23.02.05 | ability to apply finish material |

